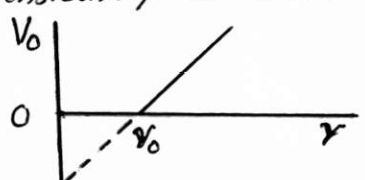


SECOND YEAR HIGHER SECONDARY EXAMINATION (SAY) JUNE 2019

Subject: PHYSICS

Code No: SY 24

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		Questions 1 to 4 carry 1 score. Answer any 3 question		
1		Zero	1	1
2		4 A/s or (iv)	1	1
3		NOT gate	1	1
4		FM Frequency Modulation.	1	1
		Questions 5 to 11 carry 2 scores each. Answer any six questions		
5	a	Graph. A	1	2
	b	$C_{eff} = C_1 + C_2$ a or b correct give 2 marks.	1	
6	a	$r = \frac{mv}{Bq}$ $r \propto \frac{1}{q}$	1	2
		$r_1 : r_2 = 1 : 2$ Ans: only give 2 marks.	1	
7	a	AC circuit containing inductor only	1	2
	b	$P = V_{rms} I_{rms} \cos \phi = V_{rms} I_{rms} \cos \frac{\pi}{2} = 0$ equation or any correct explanation	1	
8		$\lambda = \frac{c}{\nu} = \frac{3 \times 10^8}{3 \times 10^{10}} = 10^{-2} \text{ m}$ $k = \frac{2\pi}{\lambda} = \frac{2 \times 3.14}{10^{-2}} = 628 \text{ rad/m}$ $\omega = 2\pi\nu = 2 \times 3.14 \times 3 \times 10^8 = 18.84 \times 10^8 \text{ rad s}^{-1}$ $E = 30 \sin(628x - 18.84 \times 10^8 t) \text{ Vm}^{-1}$ OR $E = E_0 \sin(kx - \omega t) \rightarrow \text{give 1 mark}$ Final equation only give two mark		2.
9	a	Brewster's law $\tan i_p = n$ or $\mu = \tan \theta$	1	2
	b	$n = \tan 53^\circ = 1.33$	1	
10	a.	Einstein's photo electric equation	1	2
	b		1	

any 3

SECOND YEAR HIGHER SECONDARY EXAMINATION (SAY) JUNE 2019

(2)

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
11	a	X- Amplitude Modulator Y- Power Amplifier	1	2
	b	$m = \frac{A_m}{A_c} = \frac{9}{12} = 0.75$ equation only give 1 score	1	
Questions 12 to 18 carry 3 scores each. Answer any Six questions				
12	a	Gauss's Theorem in electrostatics	1	3
	b	Figure → one mark Derivation of equation $F = \frac{\sigma}{2\epsilon_0}$ (OR Equation only give one mark)	2	
13	a	Diagram — (Equation E & l give one mark)	2	3
	b	Potentiometer works on null deflection method	1	
14	a	For paramagnetic susceptibility is small and positive but for ferromagnetic it is positive and high value	1	3
	b	(i) Curie law (ii) When temperature increases, at a particular temperature ferromagnetic becomes paramagnetic $\chi_m \propto \frac{1}{T}$ if any one part of b is correct give 2 marks	2	
15	a	$\mathcal{E} = Blv$	2	3
	b	$v = 720 \times \frac{5}{18} = 200 \text{ ms}^{-1}$ $\mathcal{E} = Blv = 2.19 \times 10^{-5} \times 25 \times 200 = 0.109 \text{ V}$	1	
16	a	Total Internal Reflection	1	3
	b	(i) Ray travels from denser to rarer (ii) $i > c$	1	
	c	$\text{Sinc} = \frac{n_1}{n_2}$ OR (Any 2 correct answer give 3 scores)	1	
17	a	<u>Any attempt - give 1</u>	1	3
	b	$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2meV}}$ or $\sqrt{\frac{150^\circ}{V}} \text{ \AA}$ or $\frac{12.27}{\sqrt{V}} \text{ \AA}$	2	
18	a	Negative sign implies that electrons are bound to the nucleus or attractive force.	1	

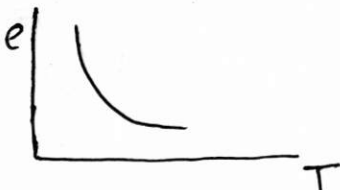

SECOND YEAR HIGHER SECONDARY EXAMINATION (SAY) JUNE 2019

(2)

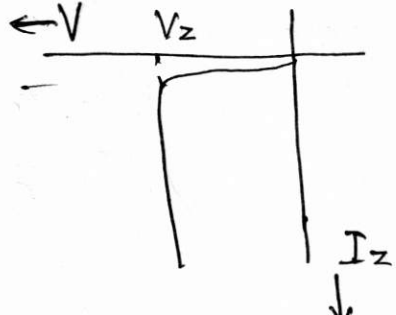
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		$\frac{1}{\lambda} = \frac{me^4}{8\epsilon_0^2 b^3 c} \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \text{ OR } R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$ <p>(Equation only give two marks)</p>	2	3
Questions 19 to 22 carry 4 scores each Answer any Three question				
19	a	Derive the equation $\vec{\tau} = \vec{P} \times \vec{E}$ (figure only give one mark)	2	4
	b	For stable equilibrium, $\theta = 0^\circ$ and for unstable equilibrium $\theta = 180^\circ$	1	
	c	$u = -p E \cos \theta = -p E \cos 0^\circ = -p E$ OR b or c correct give 2 marks	1	
20	a	Phasor diagram or vector diagram - 2 score	2	4
	b	(i) $Z = \sqrt{R^2 + (X_L - X_C)^2}$ or $Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C} \right)^2}$	2	
		(ii) $i = \frac{V_0}{Z}$ (iii) $f = \frac{1}{2\pi\sqrt{LC}}$ (OR any two part of b correct give 2 marks)		
21	a	Interfering light waves are in the same phase or with a constant phase difference	1	4
	b	Diagram - 1	1	
		Derivation - 1	1	
		$B = \frac{\lambda D}{d} - 1$ OR <u>correct Diagram only - 2 mark</u>	1	
22	a	Time taken to disintegrate half of the radioactive substance	1	
	b	$T_m = \frac{T_{1/2}}{0.693}$	1	
	c	At		

SECOND YEAR HIGHER SECONDARY EXAMINATION (SAY) JUNE 2019

(3)

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
	c	$\frac{N_0}{8} = N_0 \left(\frac{1}{2}\right)^{\left(\frac{t}{4.2}\right)}$ on solving $t = 4.2 \times 3 = 12.6 \text{ day}$ OR Any 2 parts give full mark 4 ($N_0 = N_0 e^{-\lambda t}$ give 1 mark)	2	4
Question numbers 23 to 26 carry 5 scores each Answer any				3
23	a	From $V = IR$ arrive at $i = \frac{V}{R}$	1	5
	b		1	
	c	3ohm and 3ohm in series $R_1 = 6\text{ohm}$ 6ohm and 6ohm in parallel $R_2 = 3\text{ohm}$ $R_{\text{eff}} = 6 + 3 + 5 = 14\text{ohm}$ OR (a) Ohm's Law Definition or equation 1 mark -1 (b)  -1 (c) Equation for R_{eff} of parallel $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ -1 1 mark and series ($R = R_1 + R_2$) → 1 mark	1 1 1	
24	a	$F = Bqv$	1	
	b	Using Biot-Savart's law, derive $B = \frac{\mu_0 NI}{2r}$ OR figure — 1 Derivation — 1 Equation → 2 (Biot-Savart law or equation give 1 mark)	4	

(5)

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
25	a	Define power of a lens $P = \frac{1}{f}$ SI unit is dioptre (D)	1	5
	b	Derive lens maker's formula $\frac{1}{f} = (n_2/n_1 - 1) (\frac{1}{R_1} - \frac{1}{R_2})$	3	
	c	$n_1 = n_2 \quad \frac{1}{f} = 0 \quad \text{or } f = \infty$ (Figure — 1) (Derivation — 1) (Final equation — 1) <u>If a or C correct give 2 marks</u>	1	
26	a	Zener diode	1	5
	b		2	
	c	$V_0 = V_Z = I_Z R_L$ and $I = I_Z + I_L$ the variation in put current is compensated by current through zener and there by keeping load current constant R is used to limit current through zener without reaching its burnout value	1	